



3D Cadastre Oriented Reconstruction of Administrative Procedure in Chinese Urban Land Management

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Outline

- 1 Introduction**
- 2 Land Ownership in China**
- 3 Characteristics of Current Management**
- 4 Challenges Towards Current Management**
- 5 Land Management in the Future**
- 6 Conclusion**



1 Introduction

Fundamental Realities of China

■ Creates **the world's second largest economy** in 30 years

- has 657 cities by 2011
- has 690 millions urban residents by 2011
- the per capita income of urban residents is ¥23979 by 2011

■ Consumes **a large amount of land resources** in 30 years

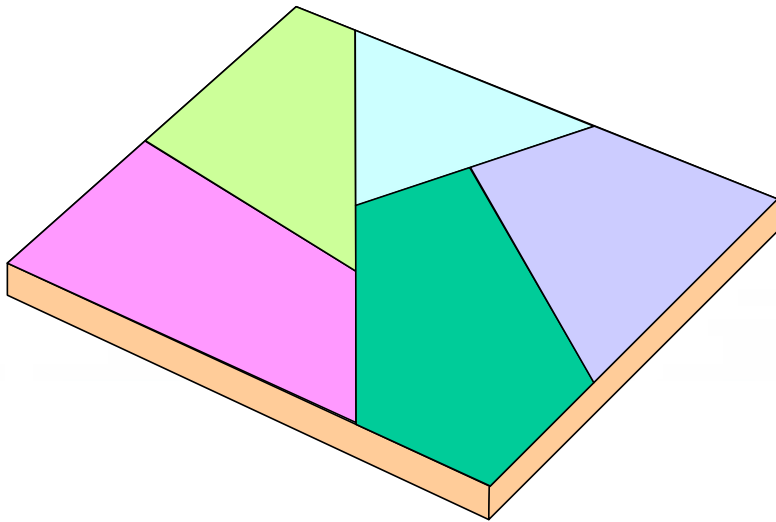
- faces the increasing contradiction between human beings and land resources
- begins to affect the country's food security and ecological security

■ Appears **the trends of 3D land use**

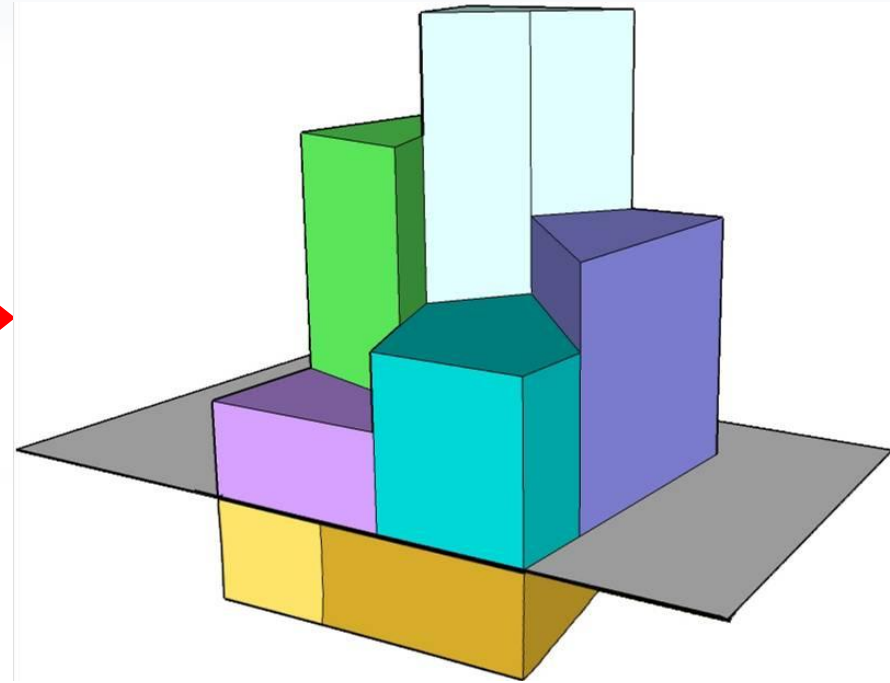
- Basic characteristic: **diversification of property rights in vertical direction** of land space

1 Introduction

the Changing of Land Use Mode in China



Traditional 2D Land Use Mode



New 3D Land Use Mode

1 Introduction

the Changing of Land Use Mode in China

Cases in Shenzhen City

360 cases

There are 360 cases of 3D land use since 2005.

12 million

The planar area of these cases is about 12,641,406 square meters.

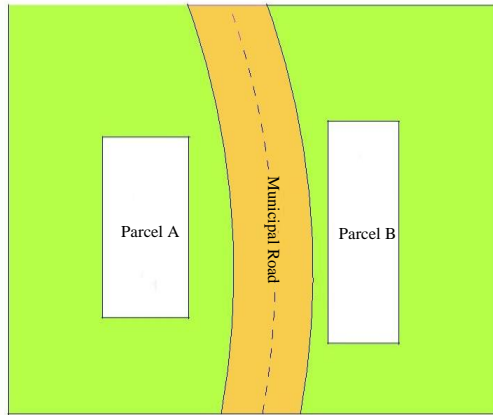
50 billion

The total value of the lands in these cases is beyond ¥50 billion.

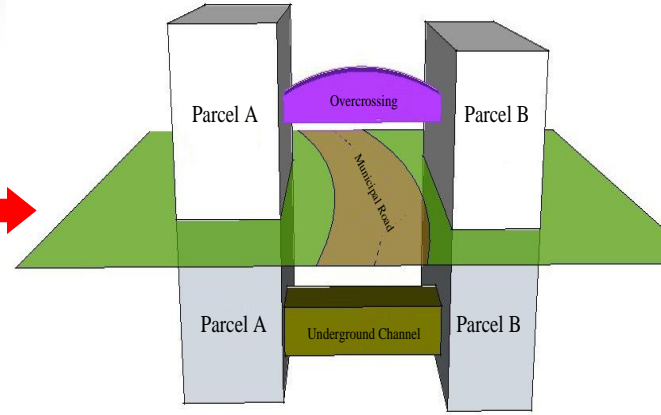
1 Introduction

the Changing of Land Use Mode in China

Cases in Shenzhen City



Cannot be Connected in
Traditional 2D Land Use Mode



Can be Connected by
Overcrossing (Buildings) and
Underground Channels in New
3D Land Use Mode

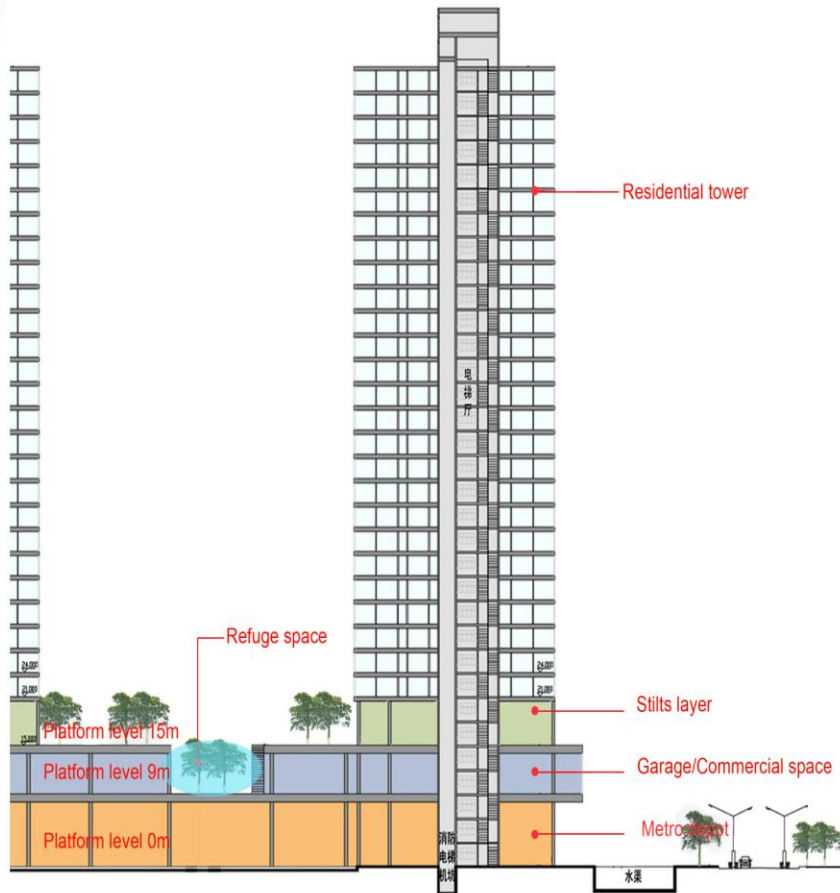


Case 1

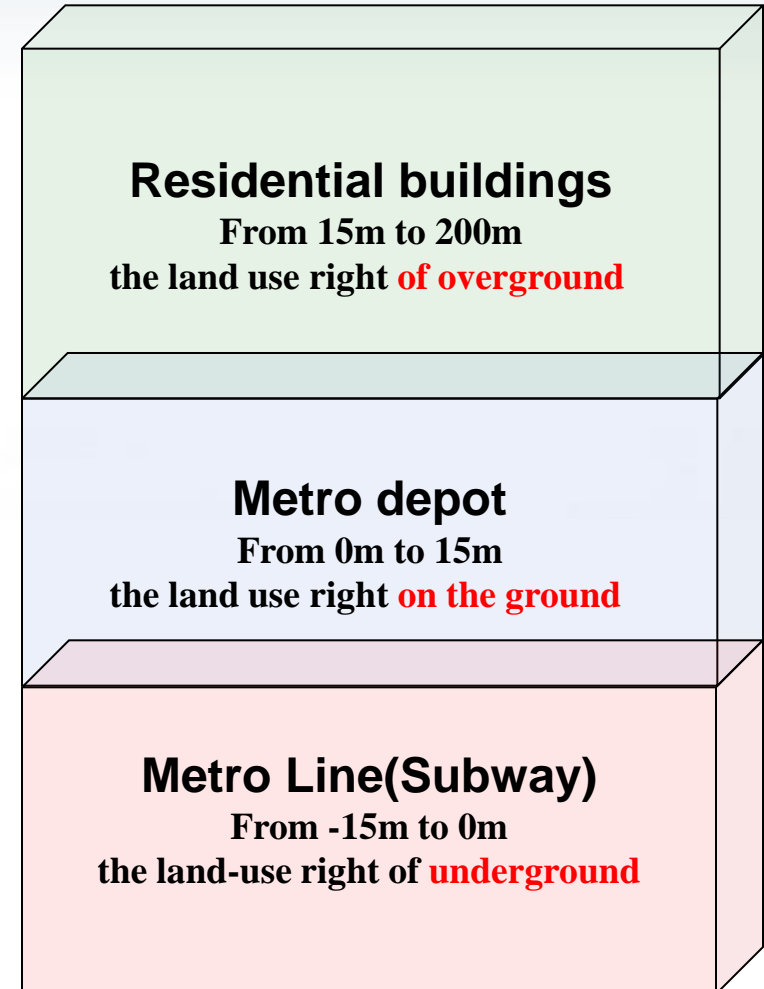
1 Introduction

the Changing of Land Use Mode in China

Cases in Shenzhen City



Case 2



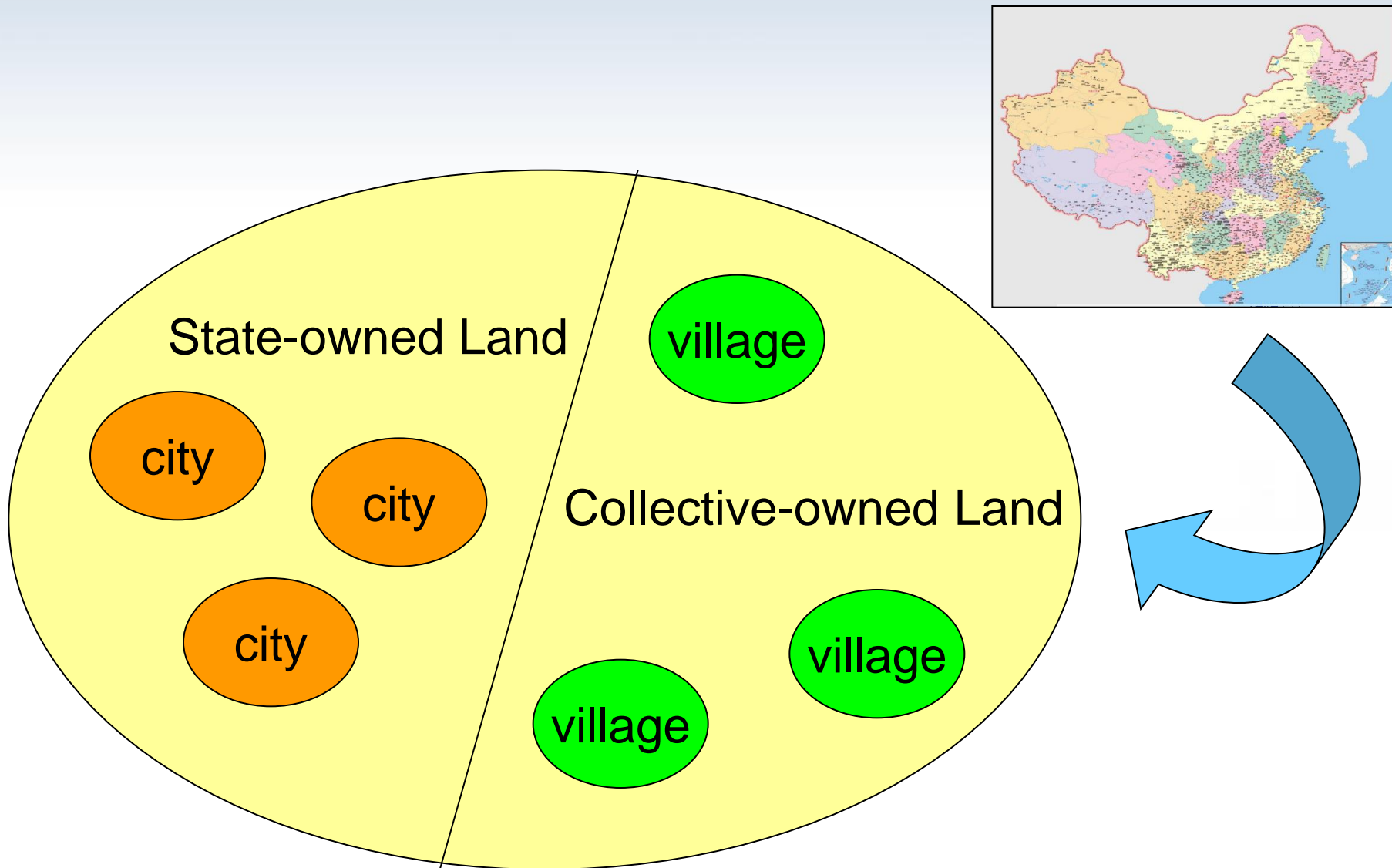
1 Introduction

the Changing of Land Use Mode in China

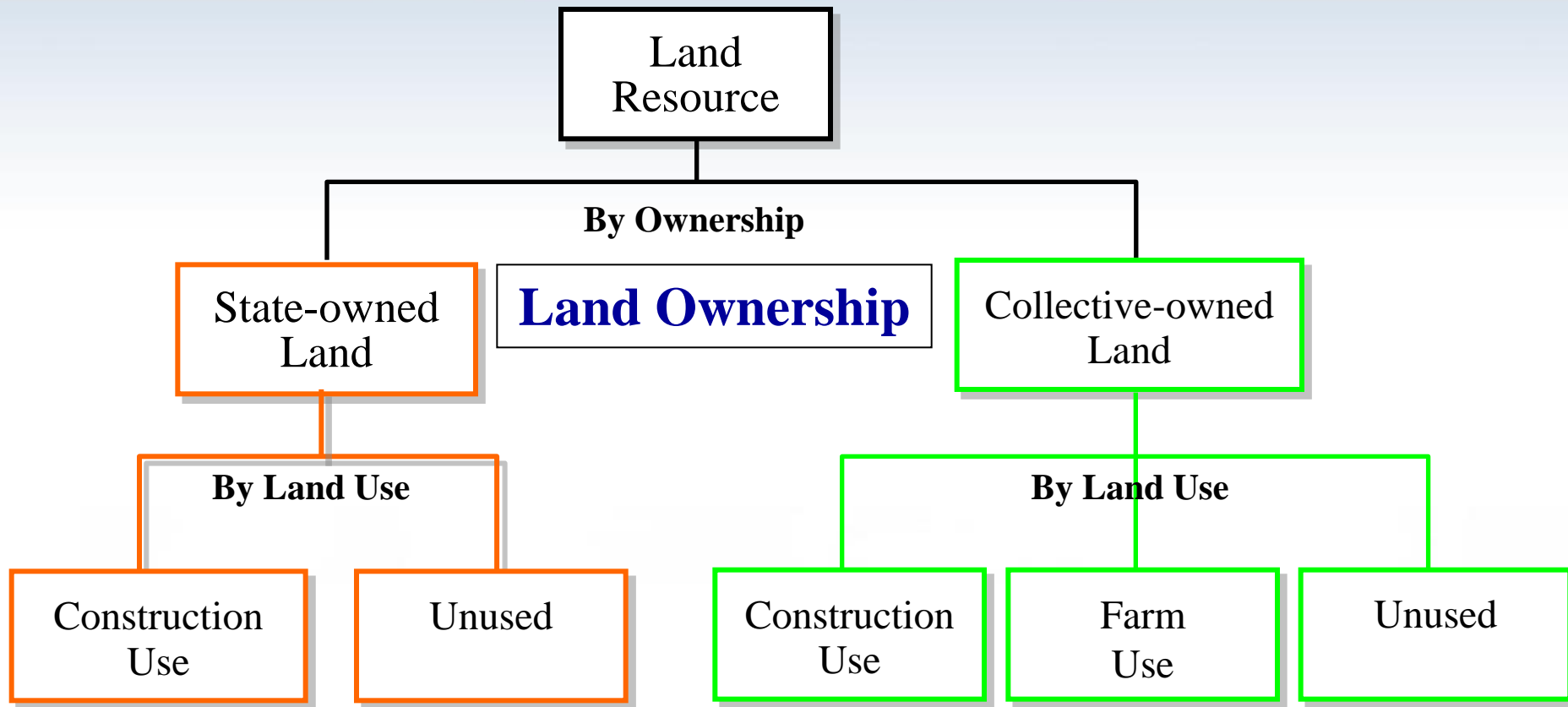
- 3D land use brings big challenges to 2D land management.
- Despite 3D cadastre technologies are available, the current administrative procedure based on traditional 2D cadastre management model may lead to many potential troubles for 3D land use management in the future, such as property right conflicts.

Something needs to do, and something has to be changed.....

2 Land Ownership in China

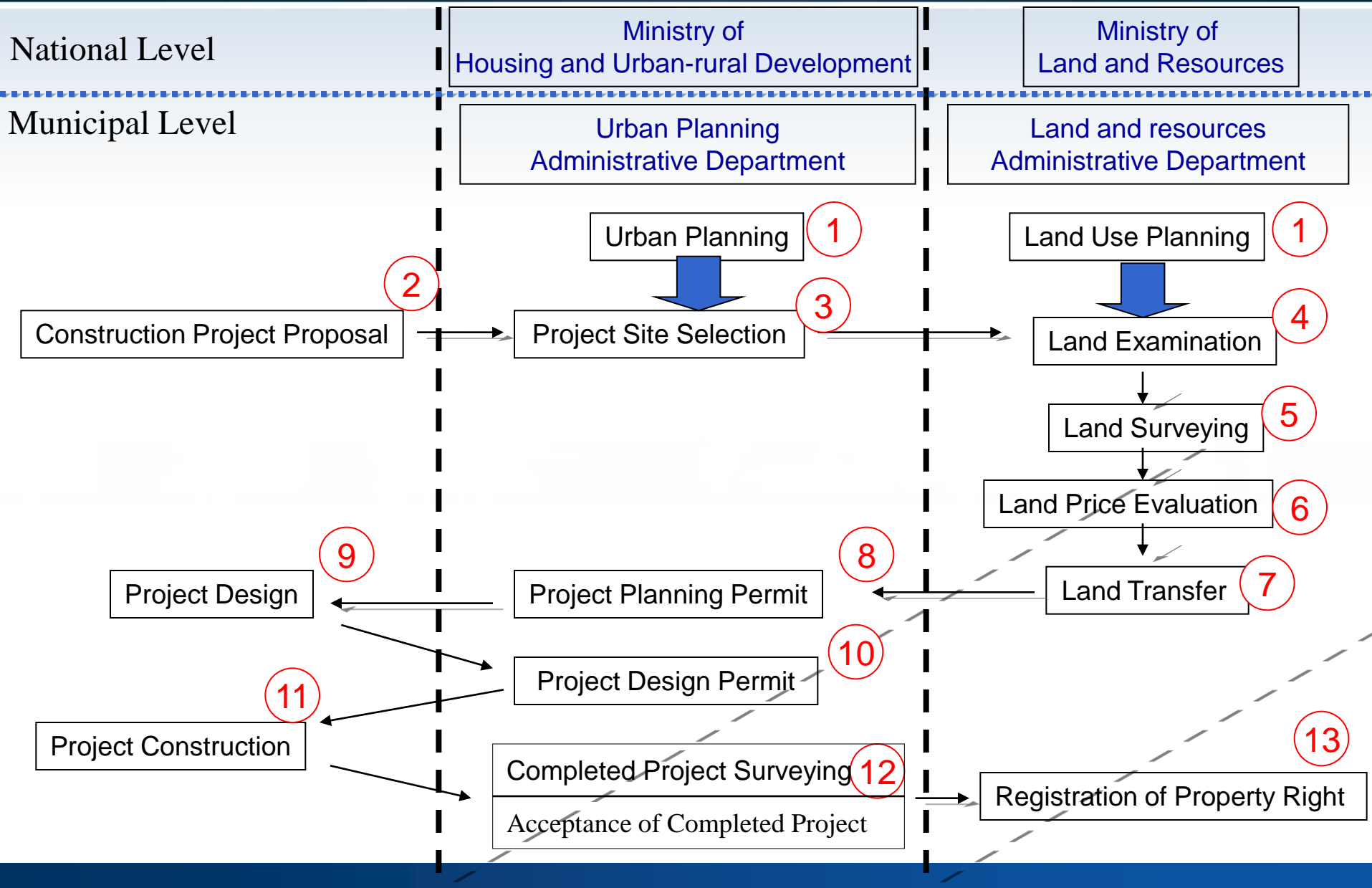


2 Land Ownership in China



Land use right: the object of urban land management in China

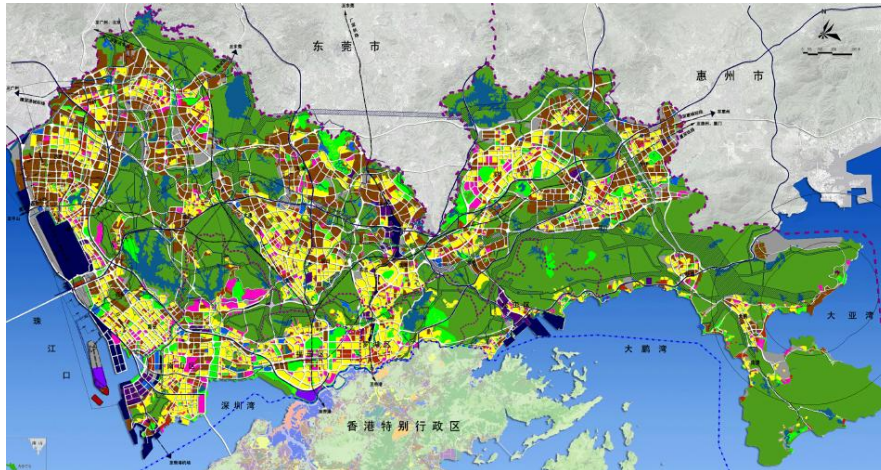
3 Characteristics of Current Land Management



4 Challenges Towards Current Land Management

1 Urban Planning & Land Use Planning

- land use planning or urban planning is just **planar planning**
- the main content of the plans is **land use zoning**
- the main index is **the planar area** for different land use



用地代码	用地名称	用地面积 (公顷)		占建设用地比例 (%)		人均建设用地 (平方米/人)	
		现状	规划	现状	规划	现状	规划
R	居住用地	19690	22000	26.24	24.72	22.84	20.00
C	商业服务业设施用地	3590	5200	4.79	5.84	4.16	4.73
GIC	政府社团用地	3960	6600	5.28	7.42	4.60	6.00
	其中						
	教育科研用地	2054	3000	2.74	3.37	2.39	2.73
	医疗卫生用地	416	900	0.55	1.00	0.48	0.82
	文化娱乐用地	314	550	0.42	0.62	0.36	0.50
	体育设施用地	282	700	0.38	0.79	0.33	0.64
M	工业用地	26900	22000	35.85	24.72	31.20	20.00
W	仓储用地	1210	1600	1.61	1.80	1.40	1.45
T	对外交通用地	3610	6300	4.81	7.08	4.19	5.73
S	道路广场用地	8660	12200	11.54	13.70	10.05	11.09
U	市政公用设施用地	2060	3300	2.75	3.71	2.39	3.00
G	绿地	4860	9200	6.48	10.34	5.63	8.36
	其中 公共绿地	2460	6600	3.28	7.42	2.85	6.00
D	特殊用地	490	600	0.65	0.67	0.58	0.55
合计	城市建设用地	75030	89000	100.00	100.00	87.04	80.91

Lack of 3D land use planning
may lead to **unreasonable** or **disorderly** 3D land use

4 Challenges Towards Current Land Management

2 Construction Project Proposal

- only confirms **the purpose of land use**
- only presents the requirements of **land size** and **construction quantity**

3 Construction Project Site Selection

- only confirms the **location** of the project according to **urban planning**
- only proposes the **planar boundary of land** for the project
No start-stop height limitation of the land in the vertical direction

4 Land Examination

- accords with **land use planning**
- accords with land supply policy
- has **no conflicts with the existing property rights**
- takes geological checking

Some important aspects are not concerned, such as
easement
(predial servitude)

4 Challenges Towards Current Land Management

5 Land Surveying

- **2D cadastral surveying** and mapping
- surveying the planar coordinates of boundary

No surveying of the boundary in the vertical direction

6 Land Price Evaluation

- the price evaluation is based on existing **2D parcel evaluation theory**
- the evaluation for underground space is just by the ground parcel price multiplied with some certain factor.

No mature theories and technologies for 3D parcel evaluation

7 Land Transfer

- the object is **a planar parcel**
- the horizontal range of this parcel is confirmed, but not the vertical range

We have released land use right with no definite spatial range!

4 Challenges Towards Current Land Management

8 Project Planning Permit

- confirm the **land size**
- confirm the **construction quantity** (such as **plot ratio**, **building area**)

9 Project Design

- propose the detailed **construction engineering design**
- propose the detailed **construction drawing design**

10 Project Design Permit

- confirm the construction engineering design
- confirm the construction drawing design

the vertical limitation of the land use right is determined by the vertical range of the project (building) **acquiescently**, not **absolutely**!

4 Challenges Towards Current Land Management

11 Project Construction

- implement the project construction under planning and design

12 Completed Project Surveying

- survey **the coordinates of planar boundary** and **verticle height** of the buildings
- ensure the buildings are constructed according to the permitted project design

13 Registration of Property Right

- register the **planar position** and **coordinates of planar boudary** for the parcel
 - no registration of **spatial range** in vertical direction
 - no registration of **easement**

We have registered property right with no definite spatial range!

5 3D Cadastre Oriented Land Management in the Future

Purpose

To solve the current land management problems that are encountered in 3D land use, avoid potential conflicts, and ensure the realization of 3D land use rights

Principle

To confirm definite spatial range (horizontal and vertical) of land use right as early as possible (**before** land transfer **is better than after** that)

5 3D Cadastre Oriented Land Management in the Future

1 Urban Planning & Land Use Planning

- **Concept plan**: confirm the **strategy of 3D land use** for urban area
- **Master plan**: include **general 3D use planning** towards underground space and overground space
- **Regulatory detailed planning**: include **detailed 3D use planning** for the key regions confirmed in master plan

5 3D Cadastre Oriented Land Management in the Future

2 Define Rights Range in 3D space Before Land Transfer

- **site selection**: implement **initial 3D project planning**
- **land examination**: find out if it is necessary to **set easement**
- **land surveying**: carry on **3D surveying and mapping**
- **land price evaluation**: carry on **3D land price evaluation**

Easement should be concerned:

- Support easement (Right of Construction on other land space)
- Passing easement (Right of way)
- Daylighting easement (Right of ancient lights)
- Ventilation easement (Right of ventilation)
- View easement (Right of View)

5 3D Cadastre Oriented Land Management in the Future

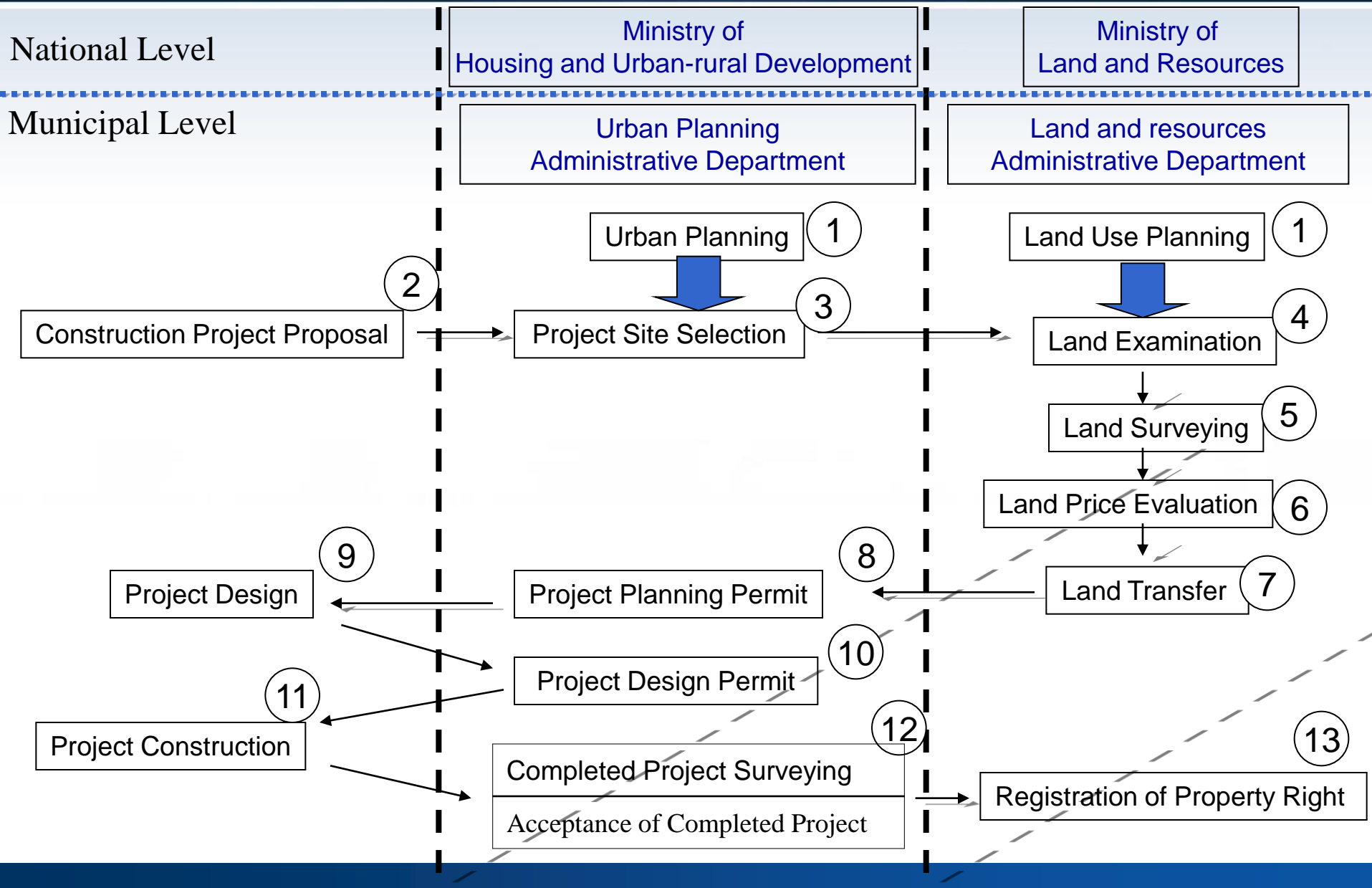
3 Coordinate Rights Range in 3D Space After Land Transfer

- **project design**: consider the relationships between this 3D Right Space with its adjacent Right Spaces (upper, lower, front, behind, left, right)
 - if it is certain to **set easement, contracts should be signed** between the servient tenement and the dominant tenement

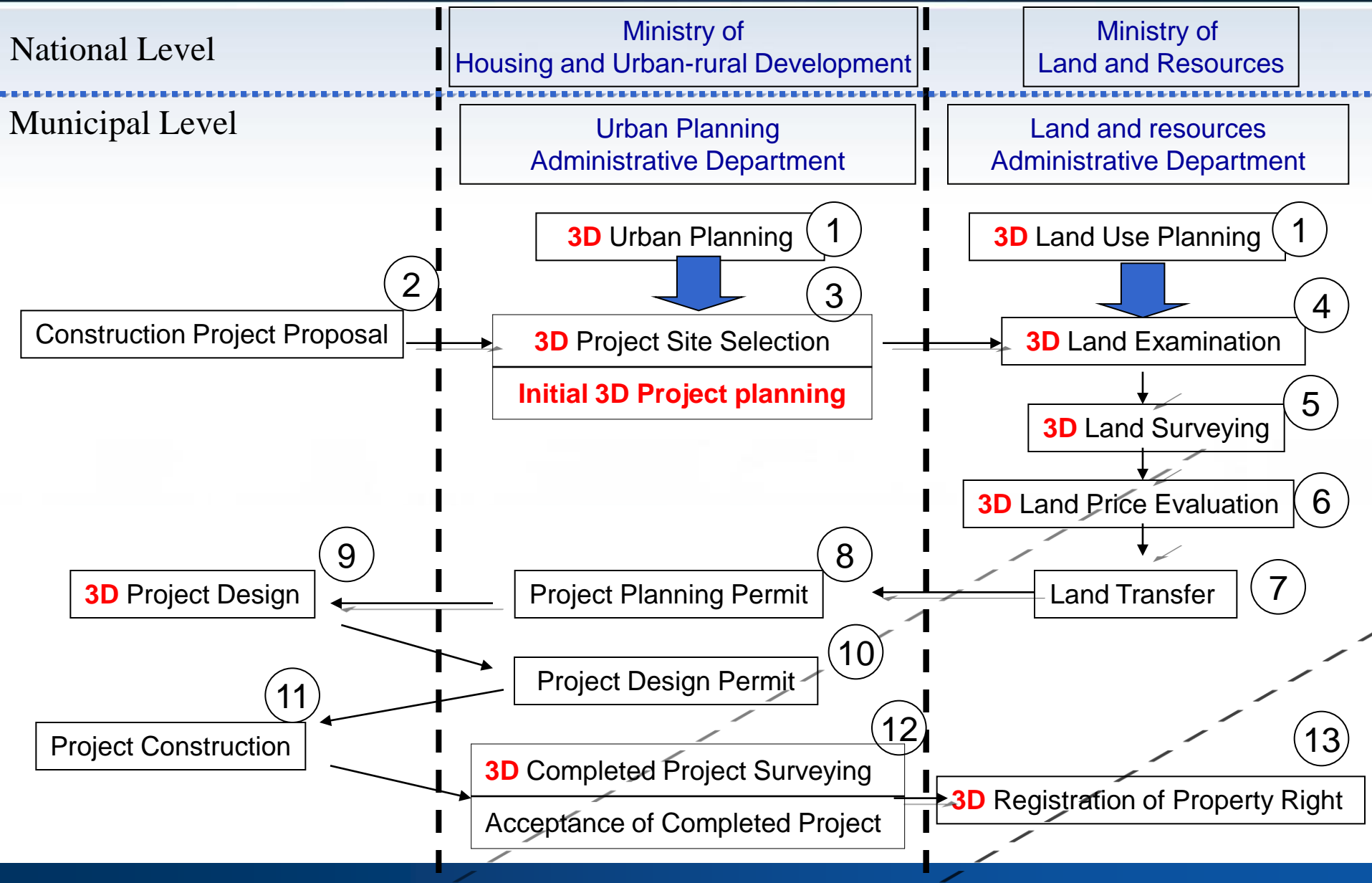
4 Registration of Property Right

- register land use right (property right) with **accurate 3D spatial range**
- register the related **easement** and others

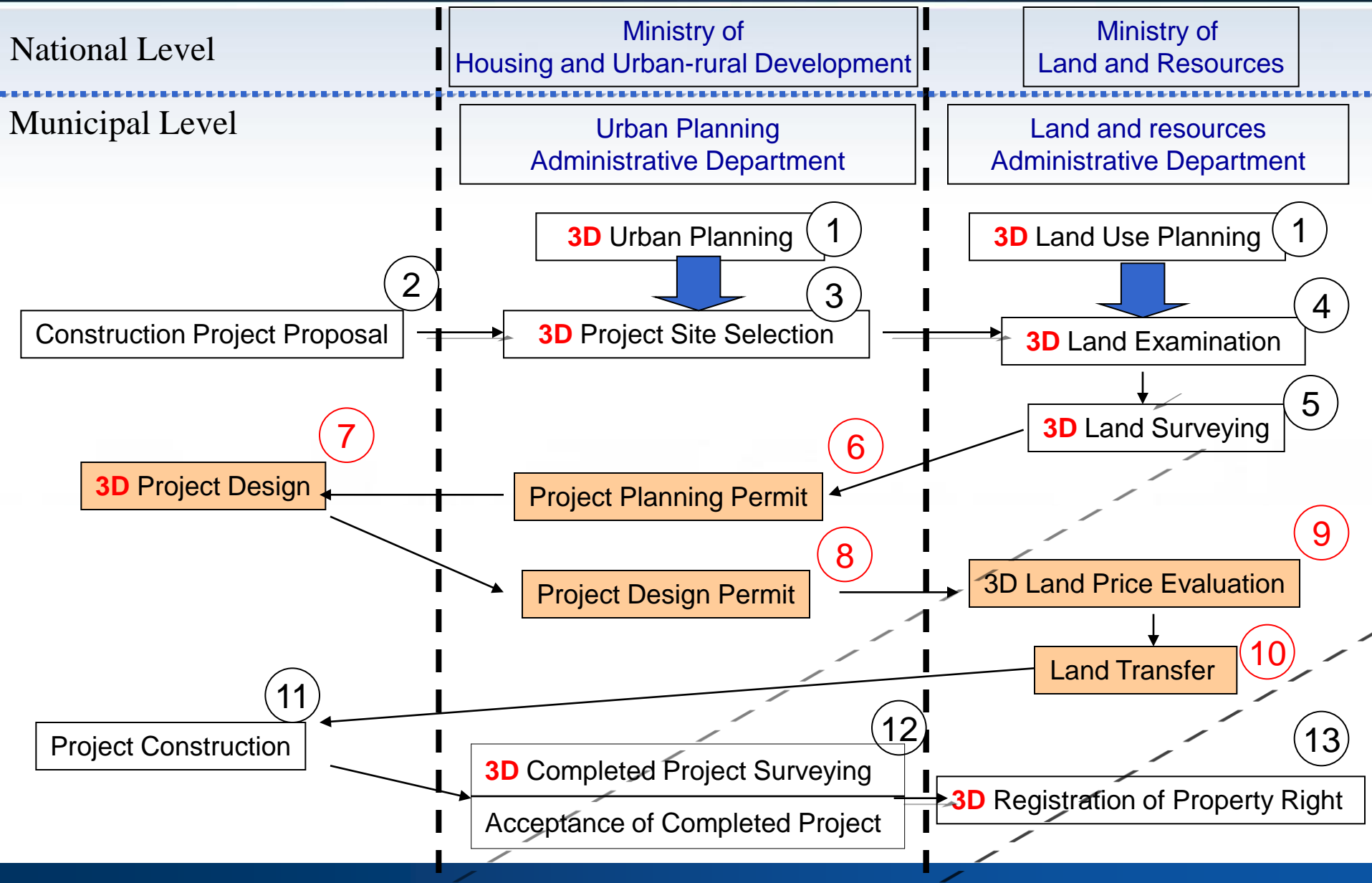
3 Characteristics of Current Land Management



5 3D Cadastre Oriented Land Management in the Future



5 3D Cadastre Oriented Land Management in the Future



6 Conclusion

Long Way to Implement 3D Cadastre Oriented Land Management

- The new land management involves big adjustment of current administrative procedure.
- It may cost much, but is imperative.



Thank You!